PETERS TOWNSHIP HIGH SCHOOL
COURSE SYLLABUS: BIOLOGY HONORS

Course Overview and Essential Skills

Biology Honors is a first year course in biology and is designed for highly motivated, college bound students. It is a fast paced course that requires daily reading and review. Students in this course typically will also take one or more Advanced Placement science courses as they proceed through high school. The goal of Honors Biology is two-fold. First, the course provides students the framework of key biological concepts into which they can integrate the many new things that they learn and encounter throughout their lives. Second, the course should familiarize students with the scientific process. This course incorporates hands-on activities, technology and labs when appropriate.

Along with taking Biology, you will take the **Keystone Biology Exam** in May, a state mandated end of course assessment. Students are required to be proficient or advanced on the Keystone Biology exam to graduate from PTHS. It is imperative that you take this exam seriously, and begin preparation from day one this school year. Students not scoring at least proficient on the keystone exam will be required to take a semester remediation course the year after testing, followed by a Keystone Exam re-take in December and/or May.

Course Textbook and Required Materials

- *Biology Concepts & Connections.* Ninth Edition. Pearson. 2018. ISBN: 978-0-13-465340-2
- Other: Online textbook and resources found at masteringbiology.com
- **Items you will need every day in class:**
  - A three ring binder with paper (use only for biology)
  - Handouts for current class material (PowerPoints, note sheets, reading guides, etc.)
  - Pen/Pencil

Course Outline of Material Covered:

Unit or Topic	Concepts/Skills/Resources	Timeframe
Basic Biological Principles and The Chemistry of Life • Chapter 1 – 3	• Introduction to Biology • Characteristics of Life • The Process of Science • Scientific Method • Graphing • Structure of an atom • Types of chemical bonds • Properties of water • Chemical reactions • Carbon • Functional groups • Water and Life • Macromolecules: carbohydrates, lipids, proteins, nucleic acids • Macromolecules Modeling Lab • pH and Organisms Lab	6 weeks
Cellular Structure, Function, Transport and Metabolism	• Prokaryotic and eukaryotic cells	6 weeks

• Chapters 4 – 5	• Microscopes • Cell organelles: Structure and function • Cell membrane structure • Transport mechanisms • The Energy of Life and ATP • Enzymes • Microscope Lab • Diffusion and Osmosis Lab • Enzyme Lab	
Bioenergetics • Chapters 6 - 7	• Overview of aerobic and anaerobic respiration • Cellular Respiration • Fermentation • Chloroplast structure and function • Light dependent and light independent reaction(Calvin cycle) of photosynthesis • Chemiosmosis in mitochondria and chloroplasts • Global warming (role of photosynthesis and respiration)	3 weeks
Cellular Reproduction and Genetics Chapters 8 – 9	• History of Cellular Biology and The Cell Theory • Asexual and Sexual Reproduction • Phases of the Cell Cycle • Mitosis • Cancer • Meiosis and Crossing Over • Comparison of Mitosis and Meiosis • Alteration of Chromosome Structure and Number • History of Mendel • Laws of Probability • Patterns of Inheritance • Linked Genes • Exceptions to Mendelian Inheritance • Mitosis Lab • Blood Typing Lab	7 weeks
Molecular Biology of the Gene Chapters 10 - 12	• History of Molecular Biology • DNA and RNA Structure and Function • DNA Replication • Transcription and Translation	3 ½ weeks

	• Mutations • Cloning • Genetic Engineering and GMOs • Gel Electrophoresis • PCR • Mutation Lab • Paper Plasmid Lab	
Evolution Chapters 13 – 14, Chapter 15 (15.14-15.19)	• Darwin's Life and Work • Natural Selection • Evidence of Evolution • Evolution of Populations • Hardy-Weinberg Equation • Mechanisms of Evolution • Speciation • Phylogeny • Natural Selection Lab	3 ½ weeks
Ecology Chapters 34, 36 - 38	• Introduction to Ecology • The Biosphere • Population Ecology • Community Ecology • Ecosystems • The Biodiversity Crisis • Human Impact	2 weeks
Keystone Exam Review	• Review for Keystone Exam and Keystone Exam	2 weeks
Diversity of Life Chapters 16 - 19	• Prokaryotes • Evolution of Plants • Animal Diversity • Bacteria Lab/Evolving STEM • Epidemic Lab • Flower Anatomy Lab	3 weeks

****Depending on the needs of the class or changes in the school year, the course outline is subject to change.***